

PATENT COOPERATION TREATY

10/009243 2661

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

STYLE, Kelda, Camilla, Karen
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RECEIVED

JUL 15 2002

Technology Center 2600

Date of mailing (day/month/year) 31 January 2002 (31.01.02)	IMPORTANT NOTIFICATION International filing date (day/month/year) 02 June 2000 (02.06.00)
Applicant's or agent's file reference 102162/KCS/s	
International application No. PCT/IB00/00840	

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address NOKIA NETWORKS OY Keilalahdentie 4 FIN-02150 Espoo Finland	State of Nationality FI	State of Residence FI
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	Facsimile No.	
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2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address NOKIA CORPORATION Keilalahdentie 4 FIN-02150 Espoo Finland	State of Nationality FI	State of Residence FI
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3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☒ the elected Offices concerned
☐ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Anne KARKACHI Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 22 February 2001 (22.02.01)	
International application No. PCT/IB00/00840	Applicant's or agent's file reference 102162/KCS/s
International filing date (day/month/year) 02 June 2000 (02.06.00)	Priority date (day/month/year) 04 June 1999 (04.06.99)
Applicant ALLAHWERDI, Nouri	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

21 December 2000 (21.12.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Zakaria EL KHODARY Telephone No.: (41-22) 338.83.38
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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 102162/KCS/s	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/IB 00/ 00840	International filing date (day/month/year) 02/06/2000	(Earliest) Priority Date (day/month/year) 04/06/1999
Applicant NOKIA NETWORKS OY		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

The abstract is changed as follows:

Line 1, after "element" insert "(104)"
line 2, after "network" insert "(100)"
line 3, after "network" insert "(200)"

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04L H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 96 21984 A (NOKIA TELECOMMUNICATIONS OY ;KARI HANNU H (FI); KARPPANEN ARTO (FI) 18 July 1996 (1996-07-18) page 1, line 17 -page 7, line 27 page 8, line 18 -page 11, line 15 figures 1,2	1,4-6, 8-10, 12-16, 18,19
A	---	2,7,11, 17,20-22
Y	WO 98 32304 A (NOKIA TELECOMMUNICATIONS OY ;KANGAS ISMO (FI); MUSTAJAERVI JARI (F) 23 July 1998 (1998-07-23) page 1, line 6 -page 6, line 23 page 10, line 28 -page 13, line 7	1,4-6, 8-10, 12-16, 18,19
A	---	2,7,11, 17,20-22
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

A document member of the same patent family

Date of the actual completion of the international search

13 October 2000

Date of mailing of the international search report

20/10/2000

Name and mailing address of the ISA

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Authorized officer

Vaskimo, K

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
Y A	<p>JORI PAANANEN: "Internet Telephony merges with the GSM Network" ERCIM NEWS ONLINE EDITION, 'Online! April 1999 (1999-04), pages 1-2, XP002124263 Retrieved from the Internet: <URL:http://www.ercim.org/publication/Ercim_News/en37/paananen.html> 'retrieved on 1999-11-25! the whole document</p>	<p>1,4-6, 8-10, 12-16, 18,19</p> <p>2,7,11, 17,20-22</p>
Y A	<p>MARKKU KYLÄNPÄÄ: "Mobile Multimedia White Paper" VTT/PROJECTS, 'Online! 12 October 1998 (1998-10-12), pages 1-6, XP002124264 Retrieved from the Internet: <URL:http://www3.vtt.fi/tte/projects/mobmulti/mobmulti.html> 'retrieved on 1999-11-25! page 6</p>	<p>1,4-6, 8-10, 12-16, 18,19</p> <p>2,7,11, 17,20-22</p>
A	<p>WO 98 32301 A (ERICSSON TELEFON AB L M) 23 July 1998 (1998-07-23)</p> <p>page 1, line 4 -page 3, line 27 page 8, line 5 - line 17 page 10, line 13 - line 30 page 12, line 5 -page 13, line 16 page 14, line 1 -page 15, line 10 figure 1</p>	<p>1,4-6, 8-10, 12-16, 18,19</p>
A	<p>PENG CHENGYUAN: "General Packet Radio Service (GPRS)" ESITELMAT/GPRS, 'Online! 15 April 1999 (1999-04-15), pages 1-16, XP002124265 Retrieved from the Internet: <URL:http://www.tcm.hut.fi/Opinnot/T...50/1999/Esitelmat/GPRS/gprs.htm> 'retrieved on 1999-11-26! page 4 -page 7 figure 2</p> <p style="text-align: center;">---</p> <p style="text-align: center;">-/--</p>	<p>1-22</p>

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>HEIMO LAAMANEN: "GPRS" GPRS-LUENTO, 'Online! 5 February 1997 (1997-02-05), pages 1-55, XP002124266 Retrieved from the Internet: <URL:http://www.cs.helsinki.fi/{helaaman/g prs_luento/sld001.htm}> 'retrieved on 1999-11-26! page 10 -page 11 page 24 page 26 page 30 -page 32 page 34 page 39 -page 40 page 44 page 50 -page 54</p> <p style="text-align: center;">-----</p>	1-22

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9621984	A	18-07-1996	FI 950117 A	11-07-1996
			AU 699246 B	26-11-1998
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			NO 973176 A	09-09-1997
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			AU 5684698 A	07-08-1998
			BR 9806769 A	16-05-2000
			CN 1250578 T	12-04-2000
			EP 0953265 A	03-11-1999



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14 December 2000 (14.12.2000)

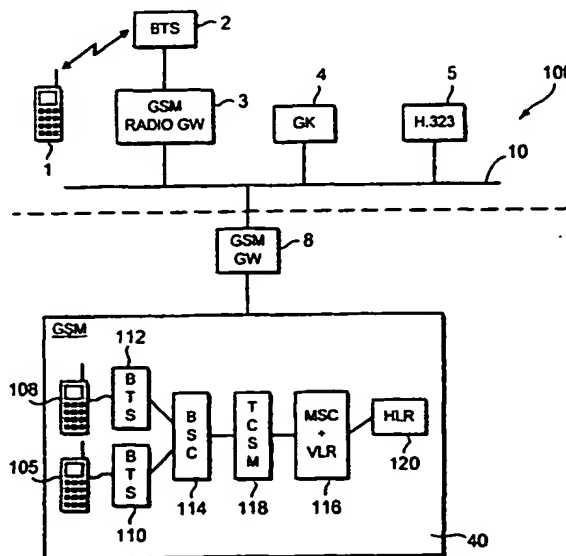
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(10) International Publication Number
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- (51) International Patent Classification⁷: H04L 12/56, 29/06 (74) Agents: STYLE, Kelda, Camilla, Karen et al.; Page White & Farrer, 54 Doughty Street, London WC1N 2LS (GB).
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9913102.1 4 June 1999 (04.06.1999) GB
- (71) Applicant (*for all designated States except US*): NOKIA NETWORKS OY [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): ALLAHWERDI, Nouri [FI/FI]; Tornitaso 7 as. 5, FIN-02120 Espoo (FI). Published: — With international search report.

[Continued on next page]

(54) Title: AN ELEMENT FOR A COMMUNICATIONS SYSTEM



WO 00/76145 A1

(57) Abstract: A network element (104), said network element being arranged to act between a first IP based network (100) and a second packet data network (200), said element comprising: a first interface arranged to communicate with said first IP based network using said IP protocol to receive signals from and send signals to the first network, said first IP based network being a private computer based network comprising wireless capabilities, a second interface arranged to communicate with said second network via an IP based connection to receive signals from and send signals to the second network.

— Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

TITLEAN ELEMENT FOR A COMMUNICATIONS SYSTEM

FIELD OF THE INVENTION

The present invention relates to an element for a communications system in particular but not exclusively for use in a general packet radio service (GPRS) type system. The present invention also relates to a communications system incorporating the element.

BACKGROUND OF THE INVENTION

Known office based communication systems usually operate with fixed line telephone units within the office linked via an internal switch board or PBX (private branch exchange). Such fixed line systems are able to provide relatively high voice quality although users are not able to move for the duration of a call.

The advent of wireless cellular telecommunication technologies, an example of which is the GSM standard (Global System for Mobile communications) means that wireless systems can provide at least the equivalent voice quality as compared to fixed line systems. Wireless cellular systems also have the advantage that the user can move.

WIO "wireless intranet office" is a proprietary communication system which is being developed by the present applicants. This WIO system introduces the concept of utilizing mobile terminals, such as conventional GSM mobile stations, in an office environment. The system makes use of a known concept called

Internet telephony or voice-over-IP. (IP stands for Internet protocol.)

Voice-over-IP allows audio, video and data information to be transmitted over the existing IP-based local or wide area networks, or the Internet. The technology thus provides for convergence and integration of the communication of three different data types over the same network.

Prior to the introduction of voice-over-IP, offices often operated three separate networks for the transmission of audio, video and data information. Fixed line telephone systems coupled to an in-house PBX provided voice communication. An office based local area network (LAN) or intranet (i.e. a packet switched internal network) having computer terminals linked via network cards and under the control of a server station provided for the transmission of "conventional" computer data. Video cameras linked to monitors via a fixed line or wireless link provided for video communications. With voice-over-IP, audio, video and data information can be transmitted simultaneously using the same packet-switched network or LAN throughout the office environment and beyond the confines of the office.

In order to provide for such media convergence, voice-over-IP often uses a specific ITU (International Telecommunication Union) standard protocol to control the information flow over the intranet. One common standard protocol used in voice-over-IP systems, and the one used in the WIO system is termed H.323. H.323 is an ITU standard for multimedia communications (for example voice, video and data) and allows multimedia streaming over conventional packet-switched networks. The protocol provides for call control, multi media management and bandwidth management for both point-to-point (two end users in communication) and

multi point (three or more end users in communication) conferences.

The H.323 protocol is network, platform and application independent allowing any H.323 compliant terminal to operate in conjunction with any other terminal.

The H.323 standard defines the use of three further command and control protocols. H.245 is for call control and is responsible for control messages governing the operation of the H.323 terminal including capability exchanges, commands and indications. Q.931 is for call signalling and is used to set up a connection between two terminals. The RAS (Registrations, Admissions and Status) signalling function governs registration, admission and bandwidth functions between endpoints and gatekeepers. Gatekeepers will be discussed in more detail hereinafter.

For a H.323 based communication system, the standard defines four major components: terminals; gateways; gatekeepers; and multi point control units (MCU).

Terminals are the user end-points on the network and can be a telephone mobile or fixed, a fax unit or a computer terminal. All H.323 compliant terminals must support voice communications and optionally video and data communications.

Gateways connect H.323 networks to other networks or protocols. For an entirely internal communications network, i.e. one with no external call facility, gateways are not required.

Gatekeepers are the control centres of the voice-over-IP network. It is under the control of a gatekeeper that most transactions

(communication between two terminals) are established. The primary functions of the gatekeeper are, bandwidth management, call control controlling the number of simultaneous H.323 connections and controlling the amount of bandwidth those calls consume. An H.323 "zone" is defined as a collection of all terminals, gateways and multi point-control units (MCU) which are managed by a single gatekeeper. Multi point control units (MCU) support communications between three or more terminals. The MCU comprises a multi point controller (MC) which performs H.245 negotiations between all terminals to determine common audio and video processing capabilities, and a multi point processor (MP) which routes audio, video and data streams between terminals. The conventional voice-over-IP system described hereinbefore normally utilizes standard fixed-line telephone systems which are subject to the disadvantages of a lack of mobility and a lack of user commands.

The WIO concept takes voice-over-IP further in that it provides for the use of conventional mobile terminals, such as GSM mobile stations, within the voice-over-IP system. To provide for such mobile communications within an intra-office communication network, the WIO system combines known voice-over-IP with the use of conventional wireless terminals within the voice-over-IP system. Those telephone units may be GSM mobile stations. This WIO concept may be in the context of a intra-office communication network.

Thus, in the WIO system intra-office calls to mobile stations are routed through the office intranet and external office calls are routed conventionally through the GSM network. Such a system provides most or all of the features supported by the mobile station and the GSM network such as telephone directories, short messaging, multiparty services, data calls, call barring, call

forwarding etc. WIO thus provides for integrated voice, video and data communications by interfacing an H.323 based voice-over-IP network with a GSM mobile network.

The WIO system is a cellular network similar to the conventional GSM network and is divided into H.323 zones as discussed hereinbefore. One H.323 zone may comprise a number of GSM cells. Two or more H.323 zones may be contained within an administrative domain.

The General Packet Radio Service (GPRS) standard has been proposed in the context of the GSM standard for the communication of data packets in a wireless network. Typical GPRS elements are: gateway GPRS support nodes (GGSN) which act as a gateway between the GPRS system and an external packet switched network; and serving GPRS support nodes (SGSN) which are connected between the GGSN and a base station system and keep track of the location of mobile stations, perform security functions and access control. These elements are in addition to the usual network elements. To date, the WIO system has not supported GPRS.

The GPRS service is usually provided by the operator of the GSM wireless network. This means that even if the GPRS service is provided between two users within an internal corporate network, the external operator will levy a charge. If a company decides to invest in a corporate network, the company will not want to pay the external operator for calls which are entirely within the corporate wireless network, regardless of whether the call is a voice or data oriented.

SUMMARY OF THE INVENTION

It is an aim of embodiments of the present invention to allow

the proposed WIO concept or the like to support a GPRS service or the like. It is an aim of further embodiments of the present invention to address the problem discussed hereinbefore.

According to one aspect of the present invention, there is provided a network element, said network element being arranged to act between a first IP based network and a second packet data network, said element comprising a first interface arranged to communicate with said first IP based network using said IP protocol to receive signals from and send signals to the first network, a second interface arranged to communicate with said second network via an IP based connection to receive signals from and send signals to the second network.

According to a second aspect of the present invention, there is provided a communication system having a first IP based network and a second packet data network, the first and second networks being connected by a network element as defined above.

BRIEF DESCRIPTION OF DRAWINGS

For a better understanding of the present invention and as to how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings in which:

Figure 1 shows a block diagram of a WIO system;

Figure 2 shows a block diagram of a modified WIO system with GPRS capability; and

Figure 3 shows a block diagram of the intranet GPRS support node of Figure 2.

DESCRIPTION OF PREFERRED EMBODIMENT

Reference will now be made to Figure 1 which shows a WIO network.

In the office environment 100, the WIO system is implemented. The WIO system has an IP (Internet protocol) based LAN 10 which is operable to carry packet form data.

One or more mobile stations (MS) 1 communicate, i.e. transmit signals to and/or receive signals from, a base transceiver station (BTS) 2. The base transceiver station 2 used in the WIO system is similar to the base transceiver stations used in conventional GSM cellular communications systems in that the base station 2 is connected to, and operates in conjunction with, a controller. In a conventional GSM system, the controller is termed a base station controller (BSC). However, in the WIO system, the controller is represented by a GSM radio access gateway 3, the function of which will be described hereinafter. The base transceiver station 2 therefore receives signals transmitted by the mobile station 1 and forwards them to the GSM radio access gateway 3. The GSM radio access gateway 3 is also connected to the LAN 10.

A WIO gatekeeper (WGK) 4 is connected to the LAN 10 as is a H.323 terminal 5. The H.323 terminal 5 may be represented by a computer terminal which may support voice and data communication.

Connected to the LAN 10 is a GSM gateway (GGW) 8. The GSM gateway 8 is connected to a standard GSM network 40 as used in conventional mobile communication systems. The network is sometimes referred to as a public land network. The WIO system allows for the use of mobile telephones in the office environment to make both internal and external office calls.

Typical components of a standard GSM network 40 are shown in Figure 1. Mobile stations 105 and 108 are associated with respective base transceiver stations 110 and 112. The respective

base transceiver stations (BTS) 110 and 112 are both controlled by the same base station controller (BSC) 114. Communications are controlled by a mobile services switching centre (MSSC) 116 and accordingly, signals from the base station controller 114 are output to the mobile services switching centre 116 via a transcoder and substrate channel multiplexer (TCSM) 118. Likewise, commands for the base station controller 114 from the mobile switching centre 116 pass via the transcoder and substrate channel multiplexer 118. The mobile services switching centre 116 also incorporates a visitor location register (VLR). The mobile switching centre 116 has access to a home location register (HLR) 120. In practice, a large number of base transceiver stations are provided and there may be more than one base station controller and mobile services switching centre 116.

It should be appreciated that signals from the GSM gateway 8 for the GSM network are forwarded to the mobile services switching centre 116 and vice versa.

The functions of the WIO components of Figure 1 will now be described in more detail. The GSM radio access gateway 3 performs similar functions to that of a base station controller in a conventional GSM network such as the management of radio resources and channel configuration and the handling of the base transceiver station configuration. However, the GSM radio access gateway 3 also provides conversion from the GSM voice data to packet based data suitable for transmitting on the packet based LAN 10. During a call, therefore, the GSM radio access gateway 3 converts the voice data transmitted by the base station 2 to the GSM radio access gateway 3 into packet-based data suitable for transmitting on the LAN 10.

The WIO gatekeeper 4 is the main controller of the WIO system and

has a high processing capability: It is responsible for all of the functions which the H.323 protocol defines to its gatekeeper, including call management and call signalling. It is also responsible for mobility management. The WIO gatekeeper 4 is able to manage the main different call types such as voice, data, facsimile and conference calls which can be established between a mobile station, a computer terminal and a normal telephone in any combination.

The GSM gateway 8 handles communications between the WIO environment and the mobile switching centre 116 of the GSM network 40. From the mobile services switching centre 116 viewpoint, the WIO appears to be a conventional base station subsystem. The GSM gateway 8 also provides isolation means for disconnecting the WIO system from the mobile services switching centre 116 in the event of WIO system failure.

The telephone calls managed by the WIO system can be divided into internal and external calls. With internal calls. Both users are in the WIO environment when the call is an external call, only one user is in the WIO environment.

Reference is now made to Figure 2 which illustrates how the system shown in Figure 1 can be modified to provide a general packet radio service (GPRS). The external network connected to the WIO environment 100 is a GPRS network 200 which has GSM and GPRS capabilities. In order to implement the GPRS network 200, the usual GSM components are used, generally with the addition of two further GPRS network nodes, the serving GPRS support node (SGSN) 186 and the gateway GPRS support node (GGSN) 182. The SGSN 186 is connected between the GGSN 182 and the base station system 188 and keeps track of the mobile stations and performs security functions and access control. The GGSN 182 acts as a gateway

between the GPRS system and another packet data network (PDN) 190.

In the office environment 100, an intranet location register (ILR) 128 is provided. The intranet location register is connected to an Intranet GPRS support node IGSN 130 which will be described in more detail hereinafter. This may be via, for example the LAN 10 of the system of Figure 1. The intranet location register 128 effectively provides the function of a home location register. However, unlike the home location register which is controlled by the network operator, the intranet location register 128 is accessible by the authorised employees of the company, such as managers of the internal network, using the WIO system. In other words, the intranet location register 128 can be corporate based.

It is alternatively possible for the intranet location register 128 to be Internet service provider based. This register 128 allows a user within the WIO environment 100 to use a GPRS service where the originator and destination are both within the WIO office environment without any signalling occurring externally of the office network.

The intranet location register 128 contains a database of subscribers in the company and allows the users to be authenticated within the company network. The intranet location register 128 also stores information as to whether a given user is permitted to roam outside the company network. The intranet location register 128 permits free GPRS services to be offered within the corporate network even if the intranet is geographically distributed.

The intranet location register 128 is LDAP (lightweight directory

access protocol) based. LDAP is a protocol which is an IETF (Internet Engineering Task Force) standard. This protocol is a standardized protocol for the accessing subscriber and device configuration information in "directory enabled" Internet protocol networks. "Directory enabled" Internet protocol networks rely on a register(s) storing relevant information on the users within the office environment 100. This information includes information on the identity of the users as well as device configuration information of the user.

The protocol which is used by the intranet location register 128 is selected so as to be compatible with or the same as protocols used by information technology departments of corporations. This allows the information technology departments to manage the register easily. It also allows for simple implementation of the register 128 on a personal computer or the like. This means that embodiments of the invention can be implemented in a cost effective manner.

The GSM gateway 8 of Figure 1 can be modified to incorporate GPRS signalling support so that a user within the WIO environment is able to communicate with the external world using the GSM network to transmit GPRS packets of data. This signalling also permits an external user using the GSM network to send GPRS packets of data to a user within the WIO office. This means that GPRS tunnelling protocols are supported by the GSM gateway 8. Additionally home location register 120 related GPRS signalling support is added to the GSM gateway 8.

However, an alternative preferred embodiment will now be described in relation to Figure 2.

In the following discussion, the following abbreviations are

used:

- SS7 Signalling System No 7 (ITU standard, the common language between telephone networks).
- MAP Mobile Application Part (part of the TCP/IP protocol suite, specific to GSM).
- TCAP Transaction Capabilities Application Part (part of the TCP/IP protocol suite).
- SCCP Signalling Connection Control Part (part of the SS7 protocol suite).
- MTP3 Message Transfer Protocol, Level 3 (part of the SS7 protocol suite).
- MTP2 Message Transfer Protocol, Level 2 (part of the SS7 protocol suite).
- MTP1 Message Transfer Protocol, Level 1 (part of the SS7 protocol suite).
- GTP GPRS Tunnelling protocol.
- L2TP Layer 2 Tunnelling Protocol.
- TCP Transmission Control Protocol (part of the TCP/IP protocol suite, maintained by IETF).
- UDP User Datagram Protocol (part of the TCP/IP protocol suite, maintained by IETF).
- IP Internet Protocol (part of the TCP/IP protocol suite, maintained by IETF).
- IPSec IP Security extensions to the TCP/IP protocol suite (IETF).
- MIP Mobile IP, mobility extensions to the TCP/IP protocol suite (IETF).
- EIR Equipment Identity Register.
- BSS Base Station Subsystem.
- ITU International Telecommunications Union.
- IETF Internet Engineering Task Force.
- VLR Visitor Location Register.

SMS-GMSC Short Message Service Gateway Mobile Switching Centre.
HLR Home Location Register.
EIR Equipment

It should be noted that the protocol layers MTP1-2 define the physical implementation of the "narrowband" SS7 network. The MTP3 layer of the SS7 protocol suite is used to transfer messages between two addresses, in a "narrowband" SS7. The MTP3 layer includes features which makes SS7 relatively tolerant to physical faults. Application level signalling messages which are transaction specified such as MAP messages, are transferred over the TCAP layer. The TCAP layer within SS7 is transferred over the SCCP layer. The SCCP layers relies on the MTP3 layer for addressing and some level of fault tolerance. All signalling toward SS7 networks within GPRS is based on MAP.

In an IP based network, application level messages may be transferred e.g. via UDP (with no guarantee that message was ever received by recipient) or via TCP (which includes "handshaking" and retransmission mechanisms, that guarantee delivery within certain constraints, if physically possible). The TCP/IP protocol suite does not go down to the physical levels, so it does not inherently include the level of fault tolerance introduced by MTP3 to the full SS7 protocol stack.

TCP/IP can be made relatively reliable, by designing the physical network in a reliable way, independent of the higher level TCP/IP protocols. The upper levels of SS7 may in practice be carried of TCP/IP based network although this is not yet standardised.

As an alternative to the modified GSM gateway, a more general signalling gateway 106 in the GPRS network 200 can be provided which acts a relay between TCAP/SCCP/MTP3/MTP2/MTP1 protocols of

the GPRS network 200 and TCAP/UDP/IP protocols of the WIO network 100. The signalling gateway 106 is required to implement the functions of the Gs (between the SGSN and the VLR) interface, the Gd (between the SGSN and the SMS-GMSC) interface, the Gr (between the SGSN and the HLR) interface, the Gc (between the GGSN and the HLR) interface and the Gf (between the SGSN and the EIR) interface. The signalling gateway 106 permits the IGSN 130 to support the functions of these interfaces over IP without having to support the SS7 protocol by carrying out the necessary protocol conversions.

The signal gateway does not modify application level signals but does modify the transmission level signals as the signalling gateway acts as a mediator between the two physically different types of networks.

The intranet GPRS support node (IGSN) 130 is provided to add GPRS backbone functionality, that is the function typically provided by the service GPRS support nodes and gateway GPRS support nodes, into the WIO office network. In other words the IGSN 130 provides some of the same functionality which is provided by the SGSN 186 and the GGSN 182 in the GPRS network 200. The IGSN 130 implements therefore a combination of SGSN and GGSN functionality with appropriate modifications to make the IGSN 130 as a single standard alone element which can be included in the office or the like of a corporate user. The IGSN 130 is connected either directly or via the LAN 10 to the intranet location register 128, the intranet 190 and the GSM radio access gateway 3.

The modifications involve removing any non-IP based external interfaces from the corporate user's version of GPRS. Thus, there are two modified interfaces compared to standard GPRS elements. Firstly the frame relay based station controller interface, known

as Gb in GPRS must be modified to allow communication with the GSM radio access gateway 3 using the Internet protocol. The interface between the SGSN 186 and the base station system 188 is the Gb interface in the conventional GPRS system 200. The GSM radio access gateway 3 may be functionally equivalent to the base station controller of a conventional GPRS system. The protocol stack which implements the interface using the Internet protocol between the IGSN 130 and the GSM radio access gateway 3, could be e.g. BSS Gb/L2TP/IP or BSS Gb/GTP/UDP/IP. Both L2TP and GTP are known tunnelling protocols, which can be used to carry BSS Gb over IP. Any other tunnelling protocols may alternatively be used to carry BSS Gb-over-IP. These protocol stacks permit signals received in the format usually used in the Gb interface to be converted to IP signals.

Secondly, the SS7 based interfaces with the GSM core networks network elements must be modified, so that the Intranet-GSN 130 may communication with them over an IP based interface. The SS7 interfaces are with the MSC/VLR (i.e. the Gs interface in GPRS), with the short message service gateway mobile switching centre (SMS-GMSC) (Gd interface), with the HLR (Gr and Gc interfaces), and the EIR (Gf interface). All of these interfaces of the known GPRS system use a subset of the GSM-MAP protocol (Mobile Application Part) over a TCAP/SCCP/MTP3/MTP2/MTP1 protocol stack. The IGSN 130 instead implements a MAP/TCAP/UDP/IP protocol stack to communicate with a network element in the operator's network acting as a signalling gateway i.e signalling gateway 106. In other words communications between the IGSN 130 and the GPRS network 200 is via this stack so that signals for the office network are in the IP format and signal from the office network to the GPRS network are in the MAP format.

As can be seen from Figure 2 the intranet GPRS support node 130

is connected to the intranet location register 128, the intranet 190 which may be the same or different to LAN 10, the GSM radio access gateway and a wireless local area network 192 (i.e. the network including the mobile stations 1 and base transceiver stations 2).

The IGSN 130 may incorporate signalling support for the GSM gateway 8 if there is not separate signalling gateway 106.

The GPRS signalling from the external environment is converted by the IGSN 130 into LDAP protocol requests for those subscribers who are managed by the corporate department or Internet service provider managing the WIO environment. In other words, the operator of the WIO environment can take the place of the GSM service provider and the intranet location register 128 can take over the function of the home location register. The IGSN 130 therefore masks the existence of the LDAP data base from the rest of the GPRS network 200.

The intranet GPRS support node 130 can also act in similar manner to the gateway GPRS support nodes and border gateways between different operators in convention GPRS systems. The Gp interface 202 between the GPRS backbones of two telecommunication operators is provided by border gateway 104 functionality. The border gateway functionality is incorporated in the IGSN 130 providing it with a secure IP based tunnel over the Internet, to the GPRS backbone operated by the network operator, i.e network 200. The WIO environment 100 and the GPRS networks 200 can be regarded as separate networks each of which has a border gateway 104 or border gateway functionality to allow secure communications between the networks.

One way to implement this functionality in the IGSN is to provide

an IPSec based tunnel from the IGSN 130 to the border gateway 104 of the GPRS network 200. The border 104 gateway of the network 200 may typically be an firewall router product. Any other secure IP based virtual private network (VPN) technology may be alternatively used. It is also possible to have a dedicated line between the border gateway 104 and the IGSN 130.

The intranet GPRS support node 130 thus acts as a gateway between the intranet location register 128 and the GPRS network 200 operated by the external operator. Thus the intranet GPRS support node 130 converts GPRS signals from the GSM network into a form in which they are compatible with the intranet location register 128 of the WIO office. Likewise, the intranet GPRS support node 130 ensures that signals intended to be GPRS signals in the GSM network from the WIO office are converted into a form compatible with the GPRS service.

The operability of the intranet GPRS support node 130 supported WIO office and the external GSM network providing the GPRS service is established with roaming agreements between the GSM network operator and the WIO office provider. The link between the GSM operator which provides the GPRS service and the intranet GPRS support node 130 is as discussed hereinbefore provided by the border gateway 104 and the border functionality of the IGSN 130. The border gateway 104 and border functionality of the IGSN 130 provides a link similar to that provided by gateways between different GSM operators in conventional systems.

The GPRS network 116 comprises the usual GPRS components including: mobile switching centre MSC and visitor location register VLR 116; home location register HLR 120; short message service gateway mobile switching centre/short message service interworking mobile switching centre SMS-GMSC/SMS-IW MSC 178; short message service centre SMS-SC 170; gateway GPRS switching

node GGSN 182 providing a connection to other packet data networks PDN 184; serving GPRS support node SGSN 186; and base station subsystem BSS 188. The border gateway BGW 106 may be connected to another public land mobile network PLMN 189.

It should be appreciated that the intranet GPRS support node 130 does not need to provide all the functions of conventional serving GPRS support nodes in that only Internet protocol interfaces are required. As discussed hereinbefore, known serving GPRS support nodes typically have more than one interface to deal with, such as frame relay and the SS7 protocols as well as interfaces to deal with the Internet protocol.

Reference is made to Figure 3 which shows a block diagram of the intranet GPRS support node 130 of Figure 2. Figure 3 shows schematically the functions of this node. The intranet GPRS support node 130 has a first part 132 which provides the gateway GPRS support node functionality and a second part 134 which provides the serving GPRS support node functionality with the Internet protocol function. Additionally a third part 136 provides a firewall and virtual private network function. This latter function allows secure (encrypted) tunnels between geographically distributed intranet sites over the Internet. Any suitable product can be used to achieve this function.

The first part 132 has a first, register 138 which stores information relating to the packet data protocol PDP context management and the access point. The first part 132 also has a intranet GPRS support node element manager and access point and session manager 142. The access point and session manager 142 has, via the third part 136, connections for the user's Internet protocol traffic between the WIO office and a public Internet port 152 or a private intranet port 154. The public Internet port

152 allows the connection with a public network eg network 200 of Figure 2. The private intranet port 154 allows the connection with the WIO network of Figure 1.

The second part 134 has a register 144 for storing GPRS mobility management information and packet data protocol PDP context information. The second part 134 also has a serving GPRS support node registration services part 146 and a location and session manager 148. The location and session manager 148 and the access point and session manager 142 are connected together by a connection 150 using the GPRS tunnelling protocol GTP to allow the exchange of information there between. The location and session manager 148 is also connected via the firewall 136 to the public Internet and private Intranet ports 152 and 154.

The third part 136 of the intranet GPRS support node 130 provides a firewall function and thus prevents unauthorised communications from taking place between the private intranet and the public Internet.

The public Internet port 152 has two tunnels or connections. The first connection 156 allows a connection with an Internet access point, eg to an IP network. This connection 156 receives and provides Internet protocol traffic of the users from and to the access point and session manager 142. The second connection 158 of the public Internet port 152 provides a connection to the home network (PLMN public land mobile network) backbone. This second connection 158 receives traffic from and provides traffic to the location and session manager 148 and the access point and session manager 142. This traffic consists of GPRS tunnelling protocol traffic to and from the location and session manager 158 and the access point and session manager 142 and GPRS domain name system traffic from the location and session manager 148.

The private intranet port 154 has three connections 160 to 164. The first connection 162 provides a tunnel or connection to the intranet access point and receives traffic from and provides traffic to the access point and session manager 142. This traffic comprises the user's Internet protocol traffic. The second connection 162 provides a connection to the GSM radio access gateway 3 as does the third connection 164. The second and third connections 162 and 164 receive and provide GPRS mobility management and session management signalling.

This intranet GPRS support node 130 has the advantage that the interfaces between the base station 2 and the serving GPRS support node, between the base station 2 and the mobile services switching centre 116, between the serving GPRS support node and home location register 120 are tunnelled or connected using the Internet protocol. This allows embodiments of the present invention to be implemented more simply and more cheaply as compared to the corresponding network element used in the currently proposed GPRS systems. In some embodiments, the Ethernet may be used instead or in addition to the Internet. Traffic intended for a user within the WIO environment from another user within the WIO environment does not need to travel over the Internet back to the intranet via the remote operator Public Land Mobile Network gateway GPRS support node 182. This improves both performance and security.

A summary of the steps taken to establish a GPRS connection within the office environment WIO are as follows:

1. Mobile terminal sends an Attach Request to IGSN 130 using its SGSN function via the GSM Radio Access Gateway 3.
2. IGSN optionally uses the LDAP protocol to check if the

identified terminal is a subscriber of the intranet local register 128.

3. If the identity code is found from the LDAP based intranet-local register 28, the user is authenticated (exchange of authentication data between the intranet location register and the mobile terminal, via, IGSN 130 and the GSM radio access gateway 3. Finally the IGSN 130 sends an attach accept message to the mobile terminal 1 via the GSM radio gateway 3. Go to step 6.
4. If the identity code was not found in the intranet location register a query is made via the signalling gateway 106 to the home location register 120 in the PLMN network 200.
5. If the identity code is found in the home location register 120, the user is authenticated (exchange of authentication data between the home location register 120 and the mobile terminal 1 via the IGSN 130, signalling gateway 106 and the home location register 120. The IGSN 130 sends an attach accept message to the mobile terminal 1 via the GSM radio access gateway 3.
6. To get an Internet protocol address, the mobile terminal then sends an activate packet data protocol context request to the IGSN 130 using its SGSN function via the GSM radio access gateway 3.
7. The IGSN's 130 SGSN function sends internally a corresponding create packet data protocol context request to its own GGSN function.
8. The IGSN's 130 GGSN function allocates an IP address to the mobile terminal by replying internally to the IGSN's 130 SGSN function with a create packet data protocol context response message.
9. The IGSN's 130 SGSN part then sends activate packet data protocol context accept message to the mobile terminal via the GSM radio access gateway 3.

10. Now the session is established and the external computers may communicate to the mobile terminal using IP via the IGSN 130 and the GSM radio access gateway 3.

Those same steps except steps 2 and 3 are used to establish a connection with the external environment.

The GSM radio access gateway 3 can be modified so as to deal with HIPERLAN based radio access or any other wireless local area network based access. HIPERLAN is a local area network standard. This may be as an alternative or additional to the radio access based on the GSM standard. It is possible to modify the mobile telephones so that they use HIPERLAN based radio access. Again this may be as an alternative to or additional to the use of the GSM standard. In the latter case dual mode telephones could be provided which can use both the GSM standard and the HIPERLAN based radio access. This is advantageous in that HIPERLAN could be used in the WIO office and GSM used in the external environment. This improves performance within the local area network of the WIO office and allows the roaming infrastructure provided by GSM to be used when the telephone is outside the WIO environment.

This can be achieved by integrating mobile IP home and foreign agent functionality in the IGSN 130 i.e. roaming. By adding wireless LAN support in an interface of the IGSN and by integrating the mobile IP Internet protocol with the IGSN's GGSN function (IP address allocation, session management), roaming can be achieved. When roaming outside the wireless local area network coverage area, a session must be re-established using GPRS protocols, but the same Internet protocol address may be re-used by the dual mode terminal.

In some embodiments of the invention, the intranet location register can be omitted. Instead the home location register of the network operator can be used to store the required information. The home location register is connected to the intranet, via the signalling gateway 106 and the IGSN 130 at the corporate premises. The home location register includes WIO and GPRS functionality. If the network operator supports location based billing schemes, the GPRS service may be provided with a discount to users accessing the service via the customer's GSM radio access gateway 3 and the IGSN 130.

It should be appreciated, that in some embodiments, the intranet GPRS support node is only connected to the GSM radio access gateway 3 within the office environment. The other connections shown within the office between the intranet GPRS support node 130 and the wireless local area network 192, the intranet 190 and the intranet local register 128 are all optional.

The WIO network may instead be a network provided by an Internet service provider.

Whilst preferred embodiments of the present invention have used the LDAP protocol, any other suitable protocol can be used. Likewise whilst the preferred embodiment of the present invention has been described in the context of a GPRS service, embodiments of the present invention may use any other suitable data service. Likewise embodiments of the present invention are also compatible with any suitable wireless communications standard or method as well as GSM.

In the preferred embodiment of the present invention, the Internet protocol is used for the payload within in the WIO office and for connections between the WIO office and the GSM

network.

The embodiment of the present invention described hereinbefore allows the information technology department of a corporation to manage its own user base and hence to manage its internal radio network. In particular GPRS communications which both originate and arrive at users within the internal network may not incur charges with the operator which manages the external network to which the corporate network is connected for external communications.

Embodiments of the present invention have the advantage that an integrated wireless system can be provided for both voice and data communication within an office which is compatible with the protocols which are used in the office. The protocols which are preferred in the office environment may be different to those used in the networks. Embodiments of the present invention also are compatible with the Internet, the Internet protocol or other protocols which are typically used or proposed to be used in the office environment in computer networks. This means that those with information technology experience are able to manage the internal corporate network.

Claims:

1. A network element, said network element being arranged to act between a first IP based network and a second packet data network, said element comprising:

a first interface arranged to communicate with said first IP based network using said IP protocol to receive signals from and send signals to the first network, said first IP based network being a private computer based network comprising wireless capabilities,

a second interface arranged to communicate with said second network via an IP based connection to receive signals from and send signals to the second network.

2. A network element as claimed in claim 1, wherein said first interface uses a tunnelling protocol to communicate with the first network.

3. A network element as claimed in claim 2, wherein said tunnelling protocol is one of:

L2TP and GTP.

4. A network element as claimed in claim 1, 2 or 3, wherein said second network is a GPRS network and said network element incorporates serving GPRS support node and gateway GPRS support node functionality.

5. A network element as claimed in any preceding claim, wherein said second interface includes one or more of the following layers in its protocol stack:

MAP; TCAP; UDP; IP.

6. A network element as claimed in any preceding claim, wherein said second interface is arranged to communicate with a gateway element of said second network.
7. A network element as claimed in any preceding claim, wherein the first interface uses the LDAP protocol to communicate with at least one element of said first network.
8. A communications system comprising a first IP based network and a second packet data network, said first and second networks being connected by a network element as claimed in any one of the preceding claims.
9. A system as claimed in claim 8, wherein said second network is connected to said element by a border gateway.
10. A system as claimed in claim 9 wherein said border gateway and said element are connected by a tunnel.
11. A system as claimed in claim 9, wherein said second network is connected to said element by a virtual private network.
12. A system as claimed in any of claims 8 to 11, wherein at least one of said first and second networks at least partially comprises a wireless communication part.
13. A system as claimed in claim 12, wherein the wireless communication part uses the GSM standard.
14. A system as claimed in claim 12, wherein said second network is general packet radio service network.
15. A system as claimed in any of claims 8 to 14, wherein said

first network is a WIO network.

16. A system as claimed in any one of claims 8 to 15, wherein said first network comprises a register for storing information relating to users in said first network, said register being arranged to be connected to said element.

17. A system as claimed in claim 16, wherein said register is in accordance with the LDAP protocol.

18. A system as claimed in any of claims 8 to 15, wherein said second network comprises a register for storing information relating to users in the first network, said register being accessible by said element.

19. A system as claimed in claims 16, 17 or 18, wherein said register stores information relating to the configuration of the users.

20. A system as claimed in any of claims 8 to 19, wherein a signalling gateway is provided in said second network to modify signals to and from said first network to be compatible with said second network and vice versa.

21. A system as claimed in any of claims 8 to 20, wherein dual mode terminals are provided to permit a user to use a wireless local area network mode in the first network and a GPRS mode in the second network.

22. A system as claimed in any of claims 8 to 21, wherein said element is part of said first network.

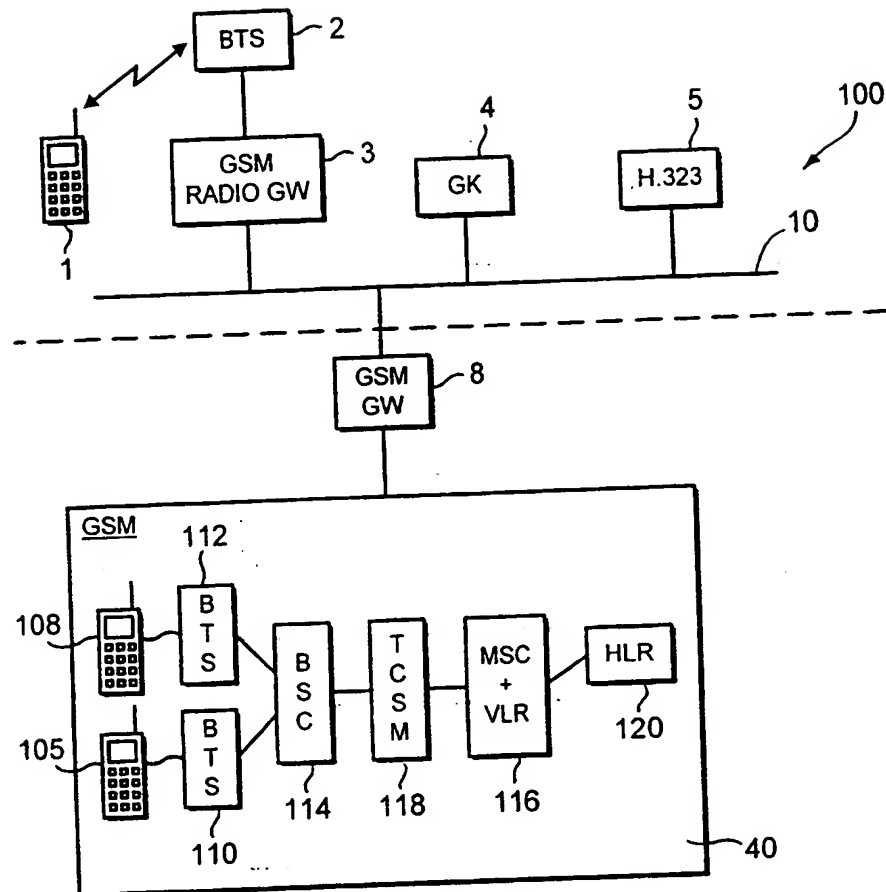


FIG. 1

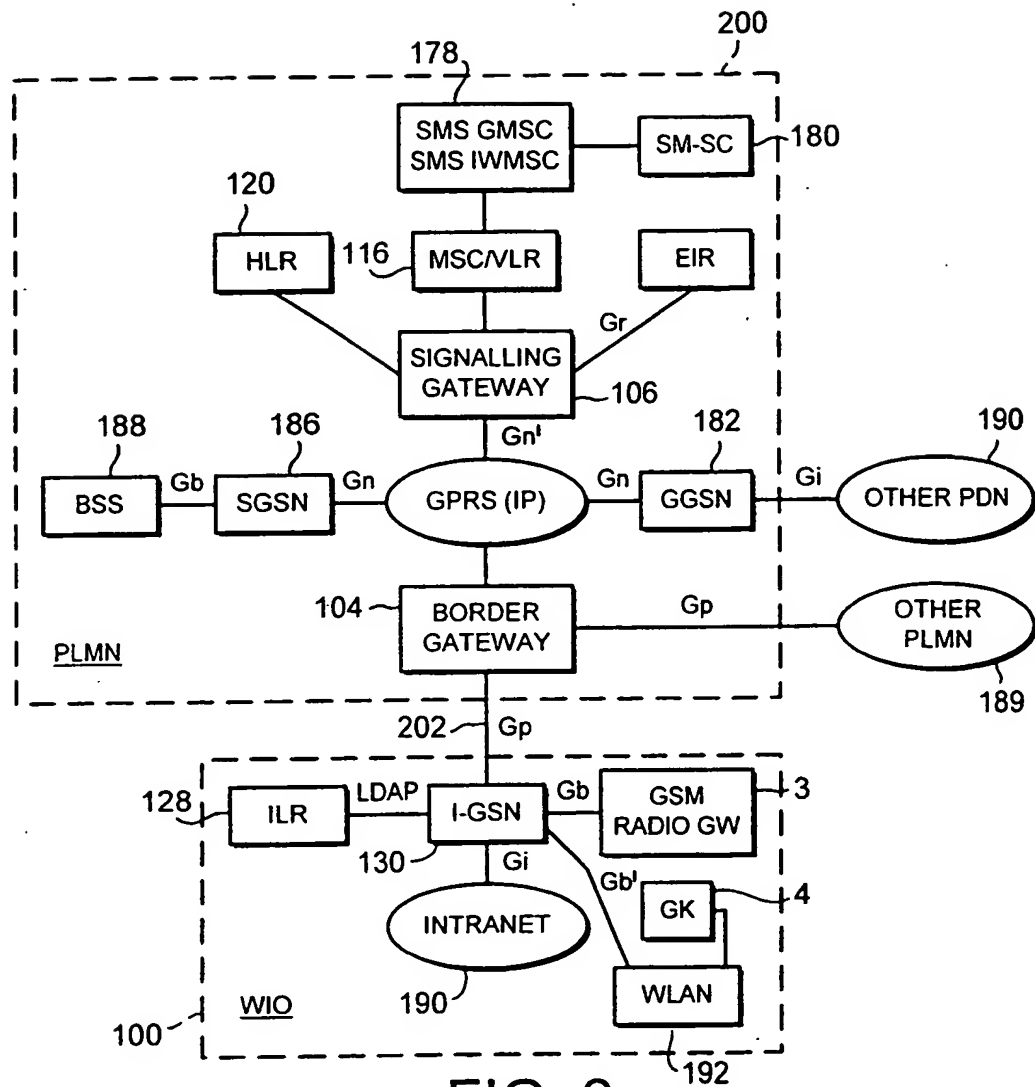


FIG. 2

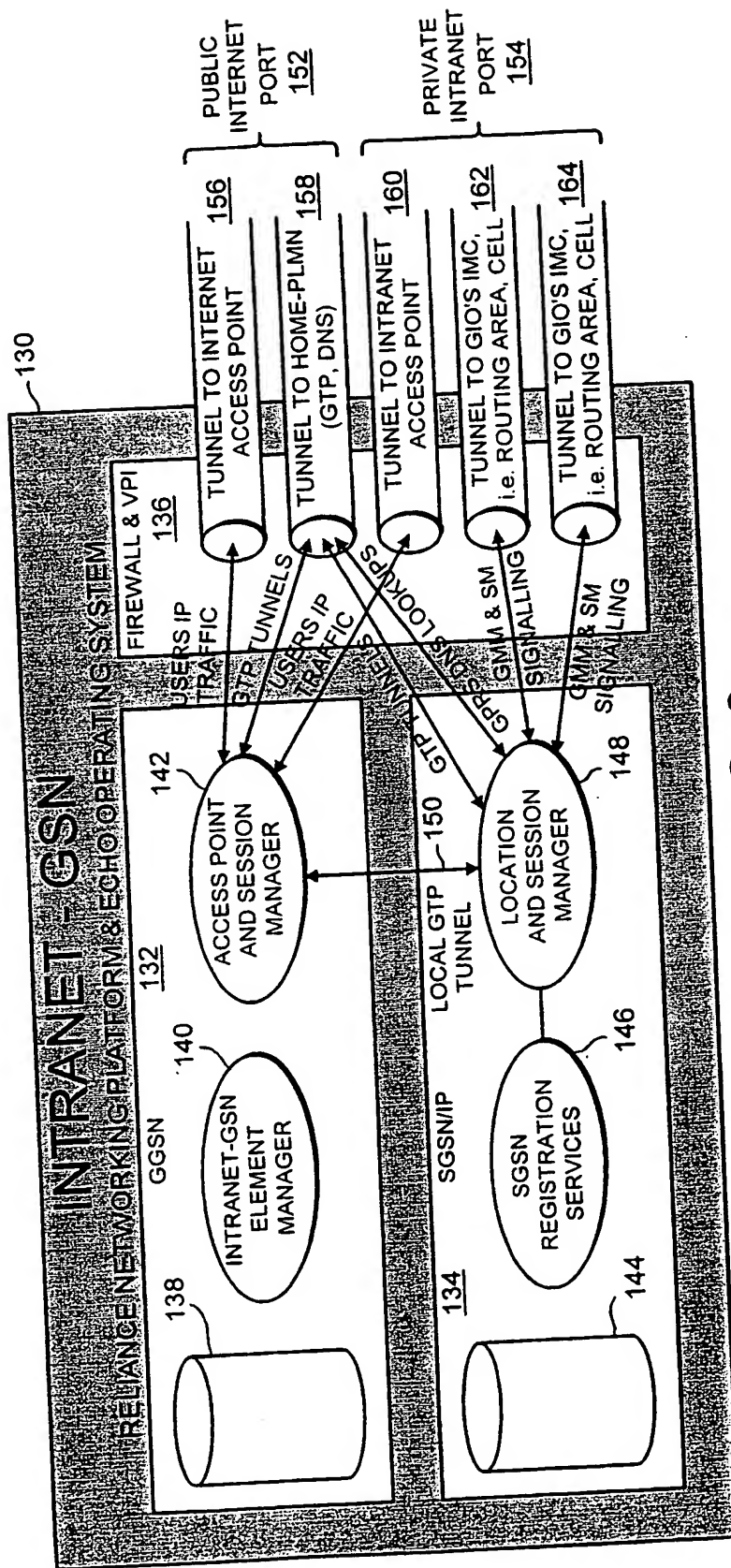


FIG. 3

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/56 H04L29/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	---	2,7,11, 17,20-22
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"8" document member of the same patent family

Date of the actual completion of the international search

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Authorized officer

Vaskimo, K

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 102162/KCS/DG		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)
International application No. PCT/IB00/00840	International filing date (day/month/year) 02/06/2000	Priority date (day/month/year) 04/06/1999
International Patent Classification (IPC) or national classification and IPC H04L12/56		
Applicant NOKIA NETWORKS OY		
<p>1. This International preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 2 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input checked="" type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 21/12/2000		Date of completion of this report 16.10.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Txc 523656 epmu d Fax +49 89 2399 - 4465		Authorized officer Jimenez Hernandez, P Telephone No. +49 89 2399 7938 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IB00/00840

I. Basis of the report

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17):*)
Description, pages:

1-24 as originally filed

Claims, No.:

6-22 as originally filed

1-5 as received on 19/09/2001 with letter of 19/09/2001

Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IB00/00840

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-22
	No: Claims
Inventive step (IS)	Yes: Claims
	No: Claims 1-22
Industrial applicability (IA)	Yes: Claims 1-22
	No: Claims

- 2. Citations and explanations**
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The subject-matter of independent claim 1 does not involve an inventive step and claim 1 therefore does not meet the requirements of Art. 33(1) and (3) PCT.
- 1.1 Claim 1 relates to a network element for interworking a private IP based network and a second network.

D1 = WO 98 32301 A (ERICSSON TELEFON AB L M) 23 July 1998 (1998-07-23), which relates to the same technical field of interworking between public/private data networks, is considered as the closest prior art.

D1, in the terminology of claim 1, discloses a network element (see GGSN in Fig. 1), said network element being arranged to act between a first IP based network (page 10, lines 18-19, page 4, lines 17-23, Fig. 1) and a second packet data network (page 10, lines 22-23, 29-30, Fig. 1), said element comprising:

a first interface arranged to communicate with said first IP based network using said IP protocol to receive signals from and send signals to the first network, said first IP based network being a private computer based network (page 1, lines 6-7), said interface being arranged so that traffic intended for a user within the first network from another user within said first network can occur without any signaling occurring externally of said first network (Fig. 1, Fig. 3),

a second interface arranged to communicate with said second network via an IP based connection to receive signals from and send signals to the second network (page 10, lines 24-26).

- 1.2 Claim 1 differs from **D1** only in that the first IP based private computer network comprises **wireless capabilities**.

It is noted that a broad interpretation of the expression "*wireless capabilities*" could obviously include the use of wireless LANs as in the IP based private

computer network disclosed in **D1** (see page 10, lines 18-21, page 14, lines 29-31 and Fig. 3), therefore rendering the subject-matter of claim 1 not inventive vis-à-vis **D1**.

It is further noted that, in a private IP network, it is well known to the person skilled in the art that traffic and communication between end stations within said network (eg wireless hosts, optional servers, Intranet end stations in Fig. 3) occur **without any external signaling**. Therefore the additional feature incorporated to the amended claim 1 is rendered obvious by **D1**.

The expression **wireless capabilities** will be nonetheless also interpreted more restrictively in the sense of the application, such as the capability of the private network to manage communication **between wireless mobile terminals adhering to a public cellular network standard such as GSM, GPRS**.

However, the subject-matter of claim 1 still lacks inventiveness under this narrow interpretation of the expression:

- 1.3 The objective problem is to reduce costs and increase reachability in the communication with public mobile terminals within the private IP network. Starting from **D1**, the skilled person is aware of the fact that only the security aspects -and not the cost aspects- are treated in said document. The skilled person would therefore look for documentation regarding other aspects in the interworking of public and private IP networks and come across **D3 = JORI PAANANEN: 'Internet Telephony merges with the GSM Network' ERCIM NEWS ONLINE EDITION, [Online] April 1999 (1999-04), pages 1-2, XP002124263 Retrieved from the Internet: <URL:http://www.ercim.org/publication/Ercim_News/en37/paananen.html> [retrieved on 1999-11-25]**. The skilled person would adapt the solution disclosed in **D3** (see Page 1) consisting of merging the private IP network and the GSM network and thus enabling the private IP network to communicate with public GSM terminals and thus achieve "**wireless capabilities**" in the sense of the application, thus arriving at the subject-matter of claim 1. Also **D2 = MÄRKKU KYLÄNPÄÄ: 'Mobile Multimedia White Paper' VTT/PROJECTS, [Online] 12 October 1998 (1998-10-12), pages 1-6, XP002124264** discloses the same type of solution (page 6, lines 8-12).

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IB00/00840

2. Claim 8, which claims a system including the subject-matter of claim 1, adds no additional subject-matter of significance to claim 1. Therefore, the above-mentioned objection regarding inventive step also applies to claim 8, Art. 33(1) and (3) PCT.
3. The additional features of the dependent claims 2-7 and 9-22 do not seem to add anything inventive to the independent claims because these features are either known from the prior art (eg tunnelling protocol, **D1**, page 6, lines 19-20, second network being a GPRS network, **D1**, Fig 1) or common measures or variations (Art. 33(3) PCT).

Re Item VII

Certain defects in the international application

1. The independent claims should have been in the two-part form vis-à-vis **D1**, Rule 6.3(b) PCT.
2. **D1**, **D2** and **D3** should have been mentioned in the description, Rule 5.1(a)(ii) PCT.
3. The description should have been adapted to any new claims, Rule 5.1(a)(III) PCT.
4. The claims should have contained reference signs in parentheses, Rule 6.2(b) PCT.

Re Item VIII

Certain observations on the international application

1. The expression "comprising wireless capabilities" in claim 1, line 8 is not clear. More precisely, it is not clear how this should be interpreted regarding the exact scope of protection sought (Art. 6 PCT), see also Item V, Point 1.2

Claims:

1. A network element, said network element being arranged to act between a first IP based network and a second packet data network, said element comprising:

a first interface arranged to communicate with said first IP based network using said IP protocol to receive signals from and send signals to the first network, said first IP based network being a private computer based network comprising wireless capabilities, said interface being arranged so that traffic intended for a user within said first network from another user within said first network can occur without any signaling occurring externally of said first network,

a second interface arranged to communicate with said second network via an IP based connection to receive signals from and send signals to the second network.

2. A network element as claimed in claim 1, wherein said first interface uses a tunneling protocol to communicate with the first network.

3. A network element as claimed in claim 2, wherein said tunneling protocol is one of:

L2TP and GTP.

4. A network element as claimed in claim 1, 2 or 3, wherein said second network is a GPRS network and said network element incorporates serving GPRS support node and gateway GPRS support node functionality.

-25a-

5. A network element as claimed in any preceding claim, wherein said second interface includes one or more of the following layers in its protocol stack:

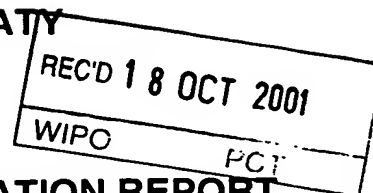
MAP;TCAP;UDP;IP.

PATENT COOPERATION TREATY



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



14

Applicant's or agent's file reference 102162/KCS/DG	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IB00/00840	International filing date (day/month/year) 02/06/2000	Priority date (day/month/year) 04/06/1999
International Patent Classification (IPC) or national classification and IPC H04L12/56		
Applicant NOKIA NETWORKS OY		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 2 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none">I <input checked="" type="checkbox"/> Basis of the reportII <input type="checkbox"/> PriorityIII <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicabilityIV <input type="checkbox"/> Lack of unity of inventionV <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statementVI <input type="checkbox"/> Certain documents citedVII <input checked="" type="checkbox"/> Certain defects in the international applicationVIII <input checked="" type="checkbox"/> Certain observations on the international application		
Date of submission of the demand 21/12/2000	Date of completion of this report 16.10.2001	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Jimenez Hernandez, P Telephone No. +49 89 2399 7938 	

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB00/00840

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-24 as originally filed

Claims, No.:

6-22 as originally filed

1-5 as received on 19/09/2001 with letter of 19/09/2001

Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IB00/00840

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-22
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-22
Industrial applicability (IA)	Yes:	Claims	1-22
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

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Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The subject-matter of independent claim 1 does not involve an inventive step and claim 1 therefore does not meet the requirements of Art. 33(1) and (3) PCT.

- 1.1 Claim 1 relates to a network element for interworking a private IP based network and a second network.

D1 = WO 98 32301 A (ERICSSON TELEFON AB L M) 23 July 1998 (1998-07-23), which relates to the same technical field of interworking between public/private data networks, is considered as the closest prior art.

D1, in the terminology of claim 1, discloses a network element (see GGSN in Fig. 1), said network element being arranged to act between a first IP based network (page 10, lines 18-19, page 4, lines 17-23, Fig. 1) and a second packet data network (page 10, lines 22-23, 29-30, Fig. 1), said element comprising:

a first interface arranged to communicate with said first IP based network using said IP protocol to receive signals from and send signals to the first network, said first IP based network being a private computer based network (page 1, lines 6-7), said interface being arranged so that traffic intended for a user within the first network from another user within said first network can occur without any signaling occurring externally of said first network (Fig. 1, Fig. 3),

a second interface arranged to communicate with said second network via an IP based connection to receive signals from and send signals to the second network (page 10, lines 24-26).

- 1.2 Claim 1 differs from D1 only in that the first IP based private computer network comprises **wireless capabilities**.

It is noted that a broad interpretation of the expression "*wireless capabilities*" could obviously include the use of wireless LANs as in the IP based private

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computer network disclosed in **D1** (see page 10, lines 18-21, page 14, lines 29-31 and Fig. 3), therefore rendering the subject-matter of claim 1 not inventive vis-à-vis **D1**.

It is further noted that, in a private IP network, it is well known to the person skilled in the art that traffic and communication between end stations within said network (eg wireless hosts, optional servers, Intranet end stations in Fig. 3) occur **without any external signaling**. Therefore the additional feature incorporated to the amended claim 1 is rendered obvious by **D1**.

The expression **wireless capabilities** will be nonetheless also interpreted more restrictively in the sense of the application, such as the capability of the private network to manage communication **between wireless mobile terminals adhering to a public cellular network standard such as GSM, GPRS**.

However, the subject-matter of claim 1 still lacks inventiveness under this narrow interpretation of the expression:

- 1.3 The objective problem is to reduce costs and increase reachability in the communication with public mobile terminals within the private IP network. Starting from **D1**, the skilled person is aware of the fact that only the security aspects -and not the cost aspects- are treated in said document. The skilled person would therefore look for documentation regarding other aspects in the interworking of public and private IP networks and come across **D3 = JORI PAANANEN: 'Internet Telephony merges with the GSM Network' ERCIM NEWS ONLINE EDITION, [Online] April 1999 (1999-04), pages 1-2, XP002124263 Retrieved from the Internet: <URL:http://www.ercim.org/publication/Ercim_News/en37/paananen.html> [retrieved on 1999-11-25]**. The skilled person would adapt the solution disclosed in **D3** (see Page 1) consisting of merging the private IP network and the GSM network and thus enabling the private IP network to communicate with public GSM terminals and thus achieve "*wireless capabilities*" in the sense of the application, thus arriving at the subject-matter of claim 1. Also **D2 = MARKKU KYLÄNPÄÄ: 'Mobile Multimedia White Paper' VTT/PROJECTS, [Online] 12 October 1998 (1998-10-12), pages 1-6, XP002124264** discloses the same type of solution (page 6, lines 8-12).

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IB00/00840

2. Claim 8, which claims a system including the subject-matter of claim 1, adds no additional subject-matter of significance to claim 1. Therefore, the above-mentioned objection regarding inventive step also applies to claim 8, Art. 33(1) and (3) PCT.
3. The additional features of the dependent claims 2-7 and 9-22 do not seem to add anything inventive to the independent claims because these features are either known from the prior art (eg tunnelling protocol, **D1**, page 6, lines 19-20, second network being a GPRS network, **D1**, Fig 1) or common measures or variations (Art. 33(3) PCT).

Re Item VII

Certain defects in the international application

1. The independent claims should have been in the two-part form vis-à-vis **D1**, Rule 6.3(b) PCT.
2. **D1**, **D2** and **D3** should have been mentioned in the description, Rule 5.1(a)(ii) PCT.
3. The description should have been adapted to any new claims, Rule 5.1(a)(III) PCT.
4. The claims should have contained reference signs in parentheses, Rule 6.2(b) PCT.

Re Item VIII

Certain observations on the international application

1. The expression "comprising wireless capabilities" in claim 1, line 8 is not clear. More precisely, it is not clear how this should be interpreted regarding the exact scope of protection sought (Art. 6 PCT), see also Item V, Point 1.2

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Claims:

1. A network element, said network element being arranged to act between a first IP based network and a second packet data network, said element comprising:

a first interface arranged to communicate with said first IP based network using said IP protocol to receive signals from and send signals to the first network, said first IP based network being a private computer based network comprising wireless capabilities,

a second interface arranged to communicate with said second network via an IP based connection to receive signals from and send signals to the second network.

2. A network element as claimed in claim 1, wherein said first interface uses a tunnelling protocol to communicate with the first network.

3. A network element as claimed in claim 2, wherein said tunnelling protocol is one of:

L2TP and GTP.

4. A network element as claimed in claim 1, 2 or 3, wherein said second network is a GPRS network and said network element incorporates serving GPRS support node and gateway GPRS support node functionality.

5. A network element as claimed in any preceding claim, wherein said second interface includes one or more of the following layers in its protocol stack:

MAP; TCAP; UDP; IP.

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The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ EP

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA		Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference 102162/KCS/DG
International application No. PCT/IB00/00840	International filing date (day/month/year) 02/06/00	(Earliest) Priority date (day/month/year) 04/06/99
Title of invention AN ELEMENT FOR A COMMUNICATIONS SYSTEM		
Box No. II APPLICANT(S)		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) NOKIA NETWORKS OY KEILALAHDENTIE 4 FIN-02150 ESPOO FINLAND		Telephone No.: Facsimile No.: Teleprinter No.:
State (that is, country) of nationality: FINLAND	State (that is, country) of residence: FINLAND	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) ALLAHWERDI, NOURI TORNITASO 7 AS. 5 FIN-02120 ESPOO FINLAND		
State (that is, country) of nationality: FINNISH	State (that is, country) of residence: FINLAND	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) 		
State (that is, country) of nationality:	State (that is, country) of residence:	
<input checked="" type="checkbox"/> Further applicants are indicated on a continuation sheet.		

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Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representative
 and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.
☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.
☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

WILLIAMS, DAVID JOHN
 PAGE WHITE & FARRER
 54 Doughty Street
 London WC1N 2LS
 United Kingdom

Telephone No.:

020 7831-7929

Facsimile No.:

020 7831-8040

Teleprinter No.:

8955681

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION**Statement concerning amendments:**

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filed

the description ☐ as originally filed
☐ as amended under Article 34

the claims ☐ as originally filed
☐ as amended under Article 19 (together with any accompanying statement)
☐ as amended under Article 34

the drawings ☐ as originally filed
☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

- ☒ which is the language in which the international application was filed.
☐ which is the language of a translation furnished for the purposes of international search.
☐ which is the language of publication of the international application.
☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

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Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (specify) | : | sheets |

For International Preliminary
Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney, reference number, if any: | 6. <input type="checkbox"/> other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

DAVID JOHN WILLIAMS
Professional Representative

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

- | | |
|--|---|
| 3. <input type="checkbox"/> The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. | <input type="checkbox"/> The applicant has been informed accordingly. |
| 4. <input type="checkbox"/> The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5. | |
| 5. <input type="checkbox"/> Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82. | |

For International Bureau use only

Demand received from IPEA on:

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PATENT COOPERATION TREATY

WO 00/76145
PCT/IB00/00840

From the INTERNATIONAL BUREAU

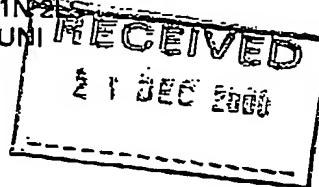
PCT

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

STYLE, Kelda, Camilla, Karen
Page White & Farrer
54 Doughty Street
London WC1N 2SS
ROYAUME-UNI



Date of mailing (day/month/year) 14 December 2000 (14.12.00)		
Applicant's or agent's file reference 102162/KCS/s		IMPORTANT NOTICE
International application No. PCT/IB00/00840	International filing date (day/month/year) 02 June 2000 (02.06.00)	
Priority date (day/month/year) 04 June 1999 (04.06.99)		
Applicant NOKIA NETWORKS OY et al		

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AG,AU,DZ,KP,KR,MZ,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CN,CR,CU,CZ,DE,DK,DM,EA,EE,EP,ES,FI,GB,GD,
GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,
NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on
14 December 2000 (14.12.00) under No. WO 00/76145

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

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Continuation of Form PCT/IB/308

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF
THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

Date of mailing (day/month/year) 14 December 2000 (14.12.00)	IMPORTANT NOTICE
Applicant's or agent's file reference 102162/KCS/s	International application No. PCT/IB00/00840
<p>The applicant is hereby notified that, at the time of establishment of this Notice, the time limit under Rule 46.1 for making amendments under Article 19 has not yet expired and the International Bureau had received neither such amendments nor a declaration that the applicant does not wish to make amendments.</p>	

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REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only	
PCT / IB 00 / 00 84 0	
International Application No.	
02 JUNE 2000	02.06.00
International Filing Date	
INTERNATIONAL BUREAU OF WIPO	
PCT International Application	
Name of receiving Office and "PCT International Application"	
Applicant's or agent's file reference 102162/KCS/STV	
(if desired) (12 characters maximum)	

Box No. I	TITLE OF INVENTION	
AN ELEMENT FOR A COMMUNICATIONS SYSTEM		
Box No. II	APPLICANT	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) Nokia Networks Oy Keilalahdentie 4 FIN-02150 ESPOO Finland		<input type="checkbox"/> This person is also inventor. Telephone No. Facsimile No. Teleprinter No.
State (that is, country) of nationality: Finland		State (that is, country) of residence: Finland
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
Box No. III	FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) ALLAHWERDI, Nouri Tomitaso 7 as. 5 FIN-02120 Espoo Finland		This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)
State (that is, country) of nationality:		State (that is, country) of residence: Finland
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.		
Box No. IV	AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) STYLE, Kelda Camilla Karen Page White & Farrer 54 Doughty Street London WC1N 2LS United Kingdom		Telephone No. 020 7831-7929 Facsimile No. 020 7831-8040 Teleprinter No. 8955681
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.		

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Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LR Liberia |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MA Morocco |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

- ☒ Republic of Mozambique MZ
- ☒ Antigua & Barbuda AG
- ☒ People's Democratic Republic of Algeria DT

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

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Box No. VI PRIORITY CLAIM

☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) (04.06.99) 4 June 1999	(GB) 9913102.1	GB		
item (2)				
item (3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA)
(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / EP

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)

30.11.99

Number

RS 103357

Country (or regional Office)

EP

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request : 4
description (excluding sequence listing part) : 24
claims : 3
abstract : 1
drawings : 2
sequence listing part of description : _____

Total number of sheets : 34

This international application is accompanied by the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☒ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☒ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☐ other (specify):

Figure of the drawings which should accompany the abstract: 1

Language of filing of the international application:

EN

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

1alda

STYLE, Kelda Camilla Karen (Agent)

For receiving Office use only

1. Date of actual receipt of the purported international application: 02 JUNE 2000	02 06 00	2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA / EP	6. <input checked="" type="checkbox"/> Transmittal of search copy delayed until search fee is paid.	

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P.B. 5818 - Patentlaan 2
2280 HV Rijswijk (ZH)
☎ (070) 3 40 20 40
TX 31651 epo nl
FAX (070) 3 40 30 16

KCS

Europäisches
Patentamt

Zweigstelle
in Den Haag

European
Patent Office

Branch at
The Hague

Office européen
des brevets

Département à
La Haye

PAGE WHITE & FARRER
Attn. Mrs Kelda Style
54 Doughty Street
LONDON WC1N 2LS
UNITED KINGDOM

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- 9 DEC 1999

Ans'd.....

Aktenzeichen/File No./No. du Dossier

RS 103357 GB

Datum/Date

08.12.1999

Das Europäische Patentamt übermittelt hiermit den Standardrecherchenbericht zu dem unten bezeichneten Antrag; Kopien der im Recherchenbericht angeführten Schriften werden in der Anlage beigelegt.

The European Patent Office herewith transmits the Standard Search Report relating to the request indicated below; copies of the documents cited in the search report are enclosed.

L'Office Européen des Brevets à l'honneur de vous transmettre ci-joint le Rapport de Recherche concernant la demande désignée ci-dessous; des copies des documents cités sont jointes.

Zeichen und Datum des Antrages Applicant's reference and date Références et date de la demande	87977/KCS/DG
Dokument, Gegenstand der Recherche Document subject of the search Objet de la recherche	GBA 9913102
Einreichungstag Filing date Date de dépôt	04/06/1999
Beanspruchte Priorität Priority claimed Priorité revendiquée	

OFFICE EUROPÉEN DES BREVETS
Pour le Vice-Président,

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DOCUMENTS CONSIDERED TO BE RELEVANT														
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim												
Y	WO 96 21984 A (NOKIA TELECOMMUNICATIONS OY ;KARI HANNU H (FI); KARPPANEN ARTO (FI) 18 July 1996 (1996-07-18) * page 1, line 17 - page 7, line 27 * * page 8, line 18 - page 11, line 15 * * figures 1,2 *	1,4-6, 8-10, 12-16, 18,19												
A	---	2,7,11, 17,20-22												
Y	WO 98 32304 A (NOKIA TELECOMMUNICATIONS OY ;KANGAS ISMO (FI); MUSTAJAERVI JARI (F) 23 July 1998 (1998-07-23) * page 1, line 6 - page 6, line 23 * * page 10, line 28 - page 13, line 7 *	1,4-6, 8-10, 12-16, 18,19												
A	---	2,7,11, 17,20-22												
Y	JORI PAANANEN: "Internet Telephony merges with the GSM Network" ERCIM NEWS ONLINE EDITION, 'Online! April 1999 (1999-04), pages 1-2, XP002124263 Retrieved from the Internet: <URL:http://www.ercim.org/publication/Ercim_News/en37/paananen.html> 'retrieved on 1999-11-25! * the whole document *	1,4-6, 8-10, 12-16, 18,19												
A	---	2,7,11, 17,20-22												
The present search report has been drawn up for all claims														
Date of completion of the search 30 November 1999		Examiner Vaskimo, K												
<table border="0"><tr><td>CATEGORY OF CITED DOCUMENTS</td><td>T : theory or principle underlying the invention</td></tr><tr><td>X : particularly relevant if taken alone</td><td>E : earlier patent document, but published on, or after the filing date</td></tr><tr><td>Y : particularly relevant if combined with another document of the same category</td><td>D : document cited in the application</td></tr><tr><td>A : technological background</td><td>L : document cited for other reasons</td></tr><tr><td>O : non-written disclosure</td><td>& : member of the same patent family, corresponding document</td></tr><tr><td>P : intermediate document</td><td></td></tr></table>			CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention	X : particularly relevant if taken alone	E : earlier patent document, but published on, or after the filing date	Y : particularly relevant if combined with another document of the same category	D : document cited in the application	A : technological background	L : document cited for other reasons	O : non-written disclosure	& : member of the same patent family, corresponding document	P : intermediate document	
CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention													
X : particularly relevant if taken alone	E : earlier patent document, but published on, or after the filing date													
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A : technological background	L : document cited for other reasons													
O : non-written disclosure	& : member of the same patent family, corresponding document													
P : intermediate document														

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DOCUMENTS CONSIDERED TO BE RELEVANT						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim				
Y	MARKKU KYLÄNPÄÄ: "Mobile Multimedia White Paper" VTT/PROJECTS, 'Online! 12 October 1998 (1998-10-12), pages 1-6, XP002124264 Retrieved from the Internet: <URL:http://www3.vtt.fi/tte/projects/mobmulti/mobmulti.html> 'retrieved on 1999-11-25! * page 6 *	1,4-6, 8-10, 12-16, 18,19				
A	---	2,7,11, 17,20-22				
A	WO 98 32301 A (ERICSSON TELEFON AB L M) 23 July 1998 (1998-07-23) * page 1, line 4 - page 3, line 27 * * page 8, line 5 - line 17 * * page 10, line 13 - line 30 * * page 12, line 5 - page 13, line 16 * * page 14, line 1 - page 15, line 10 * * figure 1 *	1,4-6, 8-10, 12-16, 18,19				
A	PENG CHENGYUAN: "General Packet Radio Service (GPRS)" ESITELMAT/GPRS, 'Online! 15 April 1999 (1999-04-15), pages 1-16, XP002124265 Retrieved from the Internet: <URL:http://www.tcm.hut.fi/Opinnot/T...50/1999/Esitelmat/GPRS/gprs.htm> 'retrieved on 1999-11-26! * page 4 - page 7 * * figure 2 *	1-22				
The present search report has been drawn up for all claims						
Date of completion of the search 30 November 1999		Examiner Vaskimo, K				
<table><tr><td>CATEGORY OF CITED DOCUMENTS</td><td>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document</td></tr><tr><td>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</td><td></td></tr></table>			CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document	
CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document					
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document						

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DOCUMENTS CONSIDERED TO BE RELEVANT						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim				
A	HEIMO LAAMANEN: "GPRS" GPRS-LUENTO, 'Online! 5 February 1997 (1997-02-05), pages 1-55, XP002124266 Retrieved from the Internet: <URL:http://www.cs.helsinki.fi/{helaaman/g prs_luento/sld001.htm}> 'retrieved on 1999-11-26! * page 10 - page 11 * * page 24 * * page 26 * * page 30 - page 32 * * page 34 * * page 39 - page 40 * * page 44 * * page 50 - page 54 * -----	1-22				
		TECHNICAL FIELDS SEARCHED (Int.CL.6)				
The present search report has been drawn up for all claims						
Date of completion of the search 30 November 1999		Examiner Vaskimo, K				
<table><tr><td>CATEGORY OF CITED DOCUMENTS</td><td>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</td></tr><tr><td>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</td><td></td></tr></table>			CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document	
CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document					
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document						

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ANNEX TO THE STANDARD SEARCH REPORT NO.

RS 103357

This annex lists the patent family members relating to the patent documents cited in the above-mentioned search report.
 The members are as contained in the European Patent Office EDP file on
 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-11-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9621984 A	18-07-1996	FI 950117 A	11-07-1996
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		EP 0953265 A	03-11-1999

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